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EXAMINER	
RUGGLES, JOHN S	
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1756	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/649,310	LIN, CHENG-MING	
	Examiner	Art Unit	
	John Ruggles	1756	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 December 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *40,42-50 and 53* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) *none* is/are allowed.

6)☒ Claim(s) *40,42-50 and 53* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

In the current 12/7/06 amendment submission, claims 1-39, 51-52, and 54-67 remain as previously cancelled, claims 40, 42, and 53 are currently amended, claim 41 is now also cancelled, and claims 43-50 remain as previously presented. Therefore, only claims 40, 42-50, and 53 remain under consideration.

The previous specific objections to the specification numbered (8) and (10) were not addressed by Applicant and are therefore maintained below.

The previous objection of claims 40-50 and 53 are withdrawn in view of the current amendment, as indicated below.

The previous rejection of claims 41 and 53 under the first paragraph of 35 U.S.C. 112 and the previous rejection of claims 40-50 under the second paragraph of 35 U.S.C. 112 based on the confusing lack of proper antecedent basis for "the transparent so that" (in the previous version of claim 40) are both withdrawn in view of the current amendment and accompanying remarks. However, this current amendment has failed to fully address the previous rejection of claims 42 and 53 under the second paragraph of 35 U.S.C. 112 due to confusion about the meaning of "T_t" and has necessitated revision of this latter rejection, which is maintained below in revised form.

The previous art rejections of the remaining claims under 35 USC 103(a) are revised below as necessitated by the current amendment and accompanying remarks.

Applicant's arguments with respect to claims 40, 42-50, and 53 have been considered, but they are either unpersuasive or moot in view of the maintained and revised ground(s) of rejection

set forth below, which have been necessitated by Applicant's current amendment. Therefore, these rejections are now made FINAL.

Specification

The disclosure is still objected to at least because of the following exemplary informalities: (8) in [0031] line 5, "fabricator" should be clarified to --mask fabricator--, along with similar changes throughout the specification; and (10) in [0028] line 22, "T_t = transmittance through line-A relative to light through line-B based on" should be corrected to --T_t = transmittance through line-A (T_1) ~~relative to light~~ divided by transmittance through line-B (T_2), based on--, in order to be consistent with the expression "$T_t = T_1/T_2$" found in [0028] line 14.

Appropriate correction is again required.

Claim Objections

The previous objection of claims 40-50 and 53 are withdrawn in view of the current amendment.

Claim Rejections - 35 USC § 112

The previous rejection of claims 41 and 53 under the first paragraph of 35 U.S.C. 112 and the previous rejection of claims 40-50 under the second paragraph of 35 U.S.C. 112 based on the confusing lack of proper antecedent basis for "the transparent so that" (in claim 40) are both withdrawn in view of the current amendment and accompanying remarks. However, this current amendment has failed to fully address the previous rejection of claims 42 and 53 under the second paragraph of 35 U.S.C. 112 due to confusion about the meaning of "T_t" and has necessitated revision of this latter rejection, which is maintained below in revised form.

It is noted that Applicant has currently cancelled claim 41 and amended claim 53 at lines 18-19 so that the second wavelength (λ_t) < the first wavelength (λ_0), which is supported by the definition of Φ_t found in paragraph [0028] of the original specification (as pointed out to Applicant in the previous 9/19/06 Office action on page 5). At [0021] lines 6-9, the first and second wavelengths are specifically exemplified as being λ_0 = 193nm and λ_t = 157nm, respectively (as previously indicated to Applicant on page 5 of the previous Office action).

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 42 and 53 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In each of (A) claim 42 line 23 and (B) claim 53 line 48, the description "T_t is the second predetermined transmittance" does not correspond to the previous expression given as $T_t = T_1/T_2$ in each of claim 42 line 10 and claim 53 line 34, respectively. However, for the purpose of this Office action, each of these claims has been interpreted in accordance with the expression $T_t = T_1/T_2$ to mean that --T_t is the ~~second predetermined~~ first transmittance of light (T_1) at λ_t through the dark areas divided by the second transmittance of light (T_2) at λ_t through the clear areas--.

Claim Rejections - 35 USC § 103

The previous art rejections of the remaining claims under 35 USC 103(a) are revised below as necessitated by the current amendment and accompanying remarks.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 40 and 44-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Doi et al. (US 5,527,647), in view of Tanaka et al. (US 2002/0022184) and either Hasegawa et al. (US 6,677,107) or Itoh (US 2003/0184721), further in view of either Dove et al. (US 5,939,225) or Mitsui et al. (US 6,242,138), and further in view of Chen (US 6,274,281).

Doi et al. teach a phase shifting mask (PSM) having a thinned halftone or attenuating PS (attPS) layer and a method of manufacturing it (title, abstract). Such an attPS is contemplated for improving photolithographic resolution to increase miniaturization of circuit patterns to manufacture a semiconductor device (col. 1 lines 13-19). In the method of manufacturing the attPSM, the attPS layer is reduced in thickness from an initial thickness 20 to a first thickness 19 by dry etching (of which reactive ion etching (RIE) is a known type, col. 1 lines 44-45, *instant claims 48-49*) or wet etching to transmit the desired amount of exposure light (e.g., T = 5% to 15%, etc., at the desired wavelength of exposure light, *instant claims 45-47*) and patterned by selective dry etching (RIE is a known type, *instant claim 50*) or wet etching of grooves or trenches 15 through the attPS layer into the transparent substrate 11 at 16, as shown in Figure 3I (col. 4 lines 26-29, 39-49). The PS obtained for various embodiments is 180° (e.g., col. 4 line 61, etc., *instant claim 44*).

Doi et al. do not specifically teach: *[1]* that the initial thickness of the attPS layer before thinning would be suitable for a first wavelength and that the thinning would make it suitable for a second wavelength that is shorter than the first wavelength; *[2]* that a part of the attPS layer with a second thickness remains at the clear areas of the attenuated PSM, wherein the second thickness is less than the previous first thickness of this layer; nor *[3]* that the initial thickness attPS layer is on a mask blank prefabricated by a first company, which is different from a second company manufacturing the attPSM from the prefabricated mask blank.

However, it is a known and even a common practice for a prefabricated mask blank and the resulting patterned mask to be made or fabricated by different companies or manufacturers, as taught by either Hasegawa et al. (col. 25 lines 1-11) or Itoh ([0046]).

Furthermore, Tanaka et al. teach several exemplary types of business and management transactions (e.g., to obtain profits while advancing the saving of environmental resources, etc.) between a first company that prepares or remanufactures and then supplies prefabricated mask blanks according to their quality or grade for use with a suitable (first) exposure wavelength and a different second company that then uses the supplied prefabricated mask blanks to make or manufacture patterned masks (e.g., the patterned masks are further used for making integrated circuits or other patterned devices by either the second company or yet another different (third) company, etc. [0327]-[0339] *[3]*). The cost of prefabricated mask blanks designed or adapted for use with shorter exposure wavelengths, such as 193nm or even 157nm, are more expensive than those adapted for use with longer exposure wavelengths [0004]. Normal mask blank remanufacturing is known to include thinning of the mask blank [0007]. Also, it is described that a "shade film" or dark film region on a mask or mask blank generally has a transmittance (T)

of $\leq 40\%$ for the exposure light (at a target wavelength), whereas a "transparent" or clear region on a patterned mask has $T \geq 60\%$ [0209]. The target exposure wavelengths alternatively include 248nm, 193nm, or 157nm [0224] and the shading or absorbing materials include resist, metals, metal nitrides, or metal silicides [0226].

Also, it has been known for some time that an attPS layer at a first thickness that is suitable for a desired transmittance (e.g., T = 5% to 15%, etc.) at a first wavelength could be made suitable for the same desired transmittance at a second wavelength that is shorter than the first wavelength by simply reducing the thickness of the attPS layer, as taught by Dove et al. (Figures 6, 8, and 10, col. 4 lines 29-49, col. 5 lines 7-11). Figure 6 shows transmittance (T, %) of an attPS layer material (SiC-N) as a function of wavelength (λ, nm) for thicknesses (D) of 50nm, 100nm, and 150nm. For this attPS layer material, ~10% T can be obtained at a first wavelength (λ_0) of about 280nm for a first thickness (D_0) of 150nm, while ~10% T can also be obtained for this same attPS layer material at a second wavelength (λ_t) of about 200nm for a second thickness (D_1) of 50nm (reading on $\lambda_0 > \lambda_t$). Figure 8 shows a similar relationship of ($MoSi_2$-O_2) attPS layer material T (%) as a function of λ (nm) for D of 175nm, 225nm, and 250nm. For this attPS layer material, ~5% T would be achieved at λ_0 of ~255nm for D_0 = 250nm, while ~5% T would also be achieved at λ_t of ~230nm for D_1 = 175nm. Figure 10 shows that for a MoO_3 attPS material, ~20% T would be observed for D_0 = 200nm at λ_0 of ~370nm, while ~20% T would also be observed for D_1 = 25nm at λ_t of ~250nm (reading on $\lambda_0 > \lambda_t$).

Alternatively, Mitsui et al. teach a halftone (attenuated) phase shift mask (attPSM), a method of manufacturing an attPSM, and an attPSM blank therefore (title, abstract, col. 1 lines 11-19). This attPSM satisfies various optical characteristics (e.g., light (optical) transmission,

amount of phase shift (PS), etc.) with high precision, as well as reducing defects in the thin film of a light translucent or semi-transparent portion (abstract, col. 1 lines 45-56), which is understood to mean an attPS layer 3a formed over a transparent substrate layer 1 (as shown in Figure 2, col. 7 lines 8-10). A typical conventional halftone (attenuated) PSM has a transparent substrate 1, a clear light transmitting portion 2, and an attenuating PS (attPS) portion 3, which is shown by Figure 1(a) and described at col. 1 lines 57-66. The transparent substrate is made of clear material (e.g., quartz, etc., col. 5 line 65) and the light (optical) transmission T of the attPS layer to the exposure light is preferably about 2% to 20% (col. 5 lines 15-17). A lower optical transmission T is preferable for line and space patterns, while a higher optical transmission T is preferable for hole system patterns (col. 5 lines 21-24). Figure 6 shows a graph for the dependency of light (optical) transmission (T, %) as a function of the wavelength (λ) of exposure light (e.g., T = 5% at λ = 248nm, T = 19% at λ = 365nm, T = 40% at λ = 488nm, etc., col. 8 lines 13-25) through an attPSM blank having a constant thickness (e.g., 931 Angstroms (Å), etc.) of a MoSiON attPS layer for a PS = 181° (Figure 5, col. 8 lines 10-13). Figure 5 also shows that for the same exposure wavelength (λ = 248nm) and nearly the same or slightly smaller PS (180°), increasing the thickness of the MoSiON attPS layer from 931 Å (93.1nm) to 1378 Å (137.8nm, Comparative Example No. 1) decreases the transmission (T) of exposure light from 5% to 2%, respectively (col. 8 lines 26-44). Thus, (optical) transmission T decreases with decreasing wavelength λ, but T increases with decreasing thickness of the attPS layer, and the amount of PS is nearly the same (approximately equal) or increases with decreasing thickness of the attPS layer. The method of manufacturing or fabricating the attPSM from an attPSM blank (e.g., having a MoSiON attPS layer, etc.) involves patterning a resist on the attPS layer of the attPSM

blank, then removing portions of the attPS layer through the resist pattern by etching (e.g., using dry etching with a gas including CF_4, etc., col. 9 lines 18-25 and col. 10 lines 3-8 and 22-28).

It is also known to make an attenuated phase shift mask (attPSM) having a part of the attPS layer with a second thickness remaining at the 0° (clear) areas between densely spaced lines or features of the attPSM, in which the second thickness is less than the previous first thickness of this layer (as taught by Chen, abstract). Chen describes an attPSM made by coating a resist 60 on a mask blank having a PS material 45 on light absorbing semi-transparent (attenuating) layer 43 (with a first thickness 49 for a first transmittance of about 4% to 20%) on a transparent substrate 40 (as shown by Figure 4), patterning the resist 60 (e.g., by electron beam, etc., as shown in Figure 5), then etching through the resist to only partially etch through and reduce the thickness of the attenuating layer 43 (at positions 46, down to a second thickness for a second transmittance of about 90% to 99%, which are relatively clear areas) between densely spaced features 44 (Figure 6, col. 4 line 28 to col. 5 line 14). The reduced thickness of attPS material 43 at positions 46 between densely spaced features 44 provides improved image quality, while avoiding the necessity of an optical proximity correction (OPC) method (col. 5 lines 14-19).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention in the method of manufacturing the attPSM that includes thinning an attPS layer from an initial or default thickness (D_0) to a first (adjusted) thickness ($D_1 < D_0$) before patterning clear areas in the attPS layer (as taught by Doi et al.) in order to make an attPSM blank designed or adapted for a first predetermined PS and (optical) transmission (T_0) at a first wavelength (λ_0) of exposure light suitable for a second shorter target wavelength (λ_t) by thinning the attPS layer (as

taught or suggested by Dove et al. or Mitsui et al., *[1]*). In the method of manufacturing the attPSM taught by Doi et al. and either Dove et al. or Mitsui et al., it would also have been obvious to remove only a portion of the attPS material having a first thickness at clear areas of the attPSM so that a part of the attPS layer with a second thickness remains at the clear areas of the attPSM, wherein the second thickness is less than the previous first thickness of this layer. This is at least because the remaining reduced thickness of the attPS layer at the clear areas between closely spaced features provides improved image quality, while avoiding the necessity of an optical proximity correction (OPC) method (as described by Chen, *[2]*). Furthermore, in the method of manufacturing the attPSM taught by Doi et al., either Dove et al. or Mitsui et al., and Chen, it would have been obvious for a first company to prefabricate the attPSM blank designed for a first predetermined PS and (optical) transmission (T_0) at a first wavelength (λ_0) of exposure light, then for a different second company to make or adapt this prefabricated attPSM blank suitable for a second shorter target wavelength (λ_t) by thinning the attPS layer before patterning the adapted attPSM blank to make an attPSM suitable for the second shorter wavelength (λ_t), because it is a known and even a common practice (as taught by Hasegawa et al. or Itoh, and Tanaka et al.) for a first company to make and supply a prefabricated mask blank (such as an attPSM blank), which a different second company obtains from the first company and then uses to make a patterned mask (such as an attPSM). Additional motivation for this combination is derived from Tanaka et al., because the cost of a prefabricated mask blank designed for use with a longer exposure wavelength (e.g., λ_0 = 193nm, etc.) is less than the cost of a prefabricated mask blank designed for use with a shorter exposure wavelength

(e.g., λ_t = 157nm, etc.), while normal mask blank remanufacturing is known to include thinning of the mask blank *[3]*.

Claims 42-43 and 53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Doi et al. (US 5,527,647), in view of Tanaka et al. (US 2002/0022184) and either Hasegawa et al. (US 6,677,107) or Itoh (US 2003/0184721), further in view of either Dove et al. (US 5,939,225) or Mitsui et al. (US 6,242,138), further in view of Chen (US 6,274,281), and further in view of Jin et al. (US 6,524,755).

While teaching various aspects of the instant claims, Doi et al., Tanaka et al. and either Hasegawa et al. or Itoh, Dove et al. or Mitsui et al., and Chen do not specifically teach the instant equations for determining phase shift and transmittance at first and second thicknesses of the attPS layer before reducing initial thickness of the attPS layer to a first thickness and patterned etching of the attPS layer to a second thickness (as recited by *instant claims 42-43 and 53*).

However, these equations are known relationships, as taught by Jin et al. Jin et al. teach methods of making attPSMs having desired optical transmission (T) and PS function (attPS) at various wavelengths achieved by controlling optical properties and thickness of constituent film layers (title, abstract). Figure 12G shows T=5% to 15% through (dark) attPS layer(s) versus T=100% for etched clear areas through a substrate. The desired or predetermined transmission is given by:

$(T_{1,2}) = T_0\exp[-4\pi k_t D_{1,3}/\lambda_t]$, where $T_{1,2}$ represents either a first transmission T_1 at a first thickness D_1 or a second transmission T_2 at a second thickness D_3, T_0 is a constant initial value for T through the attPS layer at an initial thickness D_0, (which appears to be analogous to the instant A_t), k_t is the complex part of the refractive index of the attPS layer (which is an optical

property believed to be equivalent to the instant extinction coefficient), and λ_t is the desired or predetermined wavelength of exposure light. The total phase delay through a multilayer structure, such as an attPSM, is given by:

$\Phi_{total} = \Phi_{1,2} + \Phi_S = [(n_1-1)D_{1,3} + (n_2-1)D_S]2\pi/\lambda_t$, where, Φ_t represents the total PS through plural layers ($\Phi_{1,2}$ is either a first PS at a first thickness D_1 or a second PS at a second thickness D_3 and Φ_S is the PS for the substrate having a thickness D_S), n_1 and n_2 represent refraction indices for the layers, π radians is equivalent to 180°, and λ_t is the desired or predetermined wavelength of exposure light (col. 8 line 63 to col. 9 line 19, with adaptations made to simplify comparison with the instant claims). Since the transparent substrate has the same thickness and optical properties under both the clear etched areas at a second thickness of the attPS layer and the dark areas at a first thickness of the attPS layer, the expression for the total phase delay **difference** (in degrees rather than radians) between the clear and dark areas ($\Phi_t = \Phi_1 - \Phi_2$) can be simplified and rearranged to that for a single attPS layer (having $n_1=n_t$ at λ_t) patterned by etching, which is given by:

$\Phi_t = \Phi_1 - \Phi_2 = [2(n_1-1)(D_1 - D_3)/\lambda_t]180°$ (which reads on *instant claim 42*). Figure 13F shows gradual thinning of an attPS layer 137, which is then followed by another etching step to etch further (e.g., into the substrate, etc.) to achieve a 180° phase shift depth, as shown in Figure 13G (col. 15 lines 30-37).

It would have been obvious to one of ordinary skill in the art at the time of the invention in the method of making the attPSM taught by Doi et al., Tanaka et al. and either Hasegawa et al. or Itoh, Dove et al. or Mitsui et al., and Chen to use the instant equations for determining phase shift difference between clear and dark areas of the attPSM and transmittance at first and second

thicknesses of the attPS layer at the target or predetermined second wavelength before reducing initial thickness of the attPS layer to a first thickness and patterned etching of the attPS layer to a second thickness (as taught by Jin et al.), in order to prevent overetching and plan or predetermine the desired extent of reduction in thickness (thinning) of the attPS layer from the initial thickness to the first thickness, and then further selective reduction in thickness by patterned etching to achieve the desired PS difference between dark and clear areas (preferably close to 180°) of the attPS layer, while also ensuring the predetermined amount of transmittance (e.g., T of about 5% to 20%, etc.) at the target or predetermined second wavelength. This is at least because Jin et al. teach that such equations for transmittance and PS through an attPSM are known (reading on *instant claims 42 and 53*). It would also have been obvious to reduce the thickness of the attPS layer from the initial thickness to a first thickness before further patterned etching to a second thickness (e.g., as shown by Jin et al.), because this would reasonably be expected to carefully control the PS difference (e.g., 180°, etc.) between the first and second thicknesses of the attPS layer (*instant claim 43*).

Response to Arguments

Applicant's arguments with respect to claims 40, 42-50, and 53 have been considered, but they are either unpersuasive or moot in view of the maintained and revised ground(s) of rejection set forth above, which have been necessitated by Applicant's current amendment.

In response to Applicant's argument on page 10 of 13 that the Examiner has combined an excessive number of references, reliance on a large number of references in a rejection does not, without more, weigh against the obviousness of the claimed invention. See *In re Gorman*, 933 F.2d 982, 18 USPQ2d 1885 (Fed. Cir. 1991). Applicant argues that 7 references were combined

together in the previous obviousness rejection(s). However, either Hasegawa et al. or Ito as well as either Dove et al. or Mitsui et al. were cited alternatively, so that in the first obviousness rejection of claims 40 and 44-50 set forth above only 5 separate references are relied upon, while in the second obviousness rejection of claims 42-43 and 53 only 6 separate references are relied upon.

In response to Applicant's argument on page 10 that the Examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). In this case, the knowledge available to one of ordinary skill in the art at the time of the invention, as exemplified by the cited references, was relied upon for the reasons previously given and again repeated in the revised obviousness rejections set forth above. Therefore, no improper hindsight is relied upon.

In response to Applicant's arguments on pages 10-13 that there are no suggestions to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the reasons for combining the references are either

found in the references themselves or would have been obvious from knowledge generally available to one of ordinary skill in the art, as have been previously stated and are again set forth above.

In response to Applicant's arguments on pages 10-12 that the references fail to show certain features of Applicant's invention, it is noted that many of the features upon which Applicant relies (i.e., features or limitations found in paragraphs [0005] and [0006] of the specification as currently argued on pages 10-11 and the adapting of mask blanks for use "with newer generation geometries" as argued at the top of page 12) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

In response to Applicant's arguments on pages 11-12 against the Doi et al. and Tanaka et al. references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). In this case, none of the prior art rejections either as previously set forth or as revised above rely on either Doi et al. or Tanaka et al. alone or even just these two references in combination. Rather, Doi et al. and Tanaka et al. are combined with other references for the reasons previously discussed and again set forth above.

In response to Applicant's arguments on pages 11-12 that the etching of a transparent layer to reduce its thickness at clear areas relative to dark areas (as taught by Doi et al.) and the thinning of a transparent substrate of a mask blank to reclaim or recycle the mask blank (as

taught by Tanaka et al.) both teach away from the instant invention that requires leaving a reduced thickness portion of the attPS layer at clear areas without etching the transparent substrate (the instant remaining claims refer to instant embodiment 2 as illustrated by instant Figure 6), the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981). The fact that Doi et al. and Tanaka et al. lack certain features that are present in the instant claim(s) does not automatically mean that these references "teach away" from the instant invention, especially since neither Doi et al. nor Tanaka et al. were relied upon for these certain features that are found in other cited references, which are combined with Doi et al. and Tanaka et al. for the reasons given above.

In particular, Tanaka et al. teach that the cost of prefabricated mask blanks adapted for use with shorter exposure wavelengths are more expensive than those adapted for use with longer wavelengths [0004] and that normal mask blank remanufacturing is known to include thinning of the mask blank [0007]. Dove et al. teach that a first thickness attPS layer suitable for a desired transmittance (e.g., T = 5% to 15%, etc.) at a first wavelength (λ_0) is known to be made suitable for the same desired transmittance at a second wavelength (λ_1), which is shorter than the first wavelength, by simply reducing the thickness of the attPS layer (Figures 6, 8, and 10, col. 4 lines 29-49, col. 5 lines 7-11). Alternatively to Dove et al. are the similar teachings of Mitsui et al., which indicate that the optical transmission (T) of an attPS layer decreases for shorter wavelength exposure light, but also that T increases with decreasing thickness of the attPS layer

while the amount of PS remains nearly the same. Thus, one of ordinary skill in the art would have a reasonable expectation of success for compensating the loss of T through an attPS layer thickness designed for a first wavelength exposure light when using a second shorter wavelength by simply reducing the thickness of the attPS layer on a mask blank. Chen teaches thinning an attPS layer at clear areas without removing the entire thickness of the attPS layer and without etching the underlying transparent substrate of an attPSM (just as required by the instant claims), in order to provide improved image quality (e.g., in the clear areas between densely spaced features, etc.).

The revisions to the rejections in this Office action are necessitated by Applicant's current amendment and accompanying remarks. Therefore, these rejections are now made FINAL.

Conclusion

The prior art made of record, which is not relied upon, is considered pertinent to Applicant's disclosure. Smith (US 2003/0077520) teaches either the same or at least similar attPS materials for an attPSM ([0019]-[0020], [0052]-[0053]) to those listed in the instant specification at [0030] lines 5-6.

Applicant's amendment necessitated the revised ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after

the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John Ruggles whose telephone number is 571-272-1390. The examiner can normally be reached on Monday-Thursday and alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 571-272-1385. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

jsr

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